

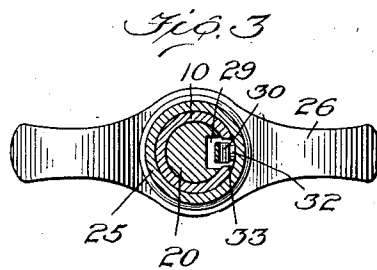
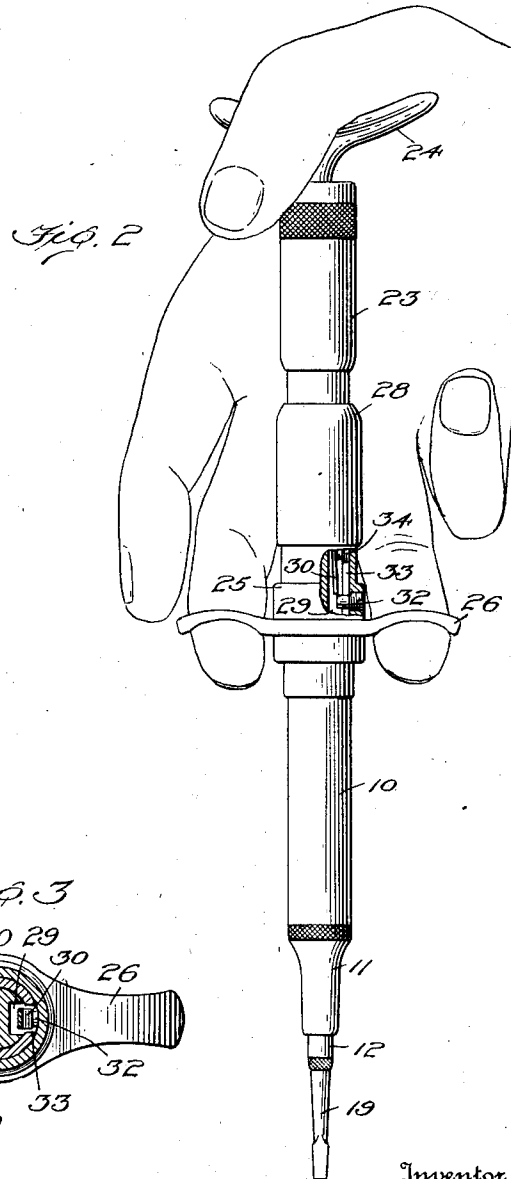
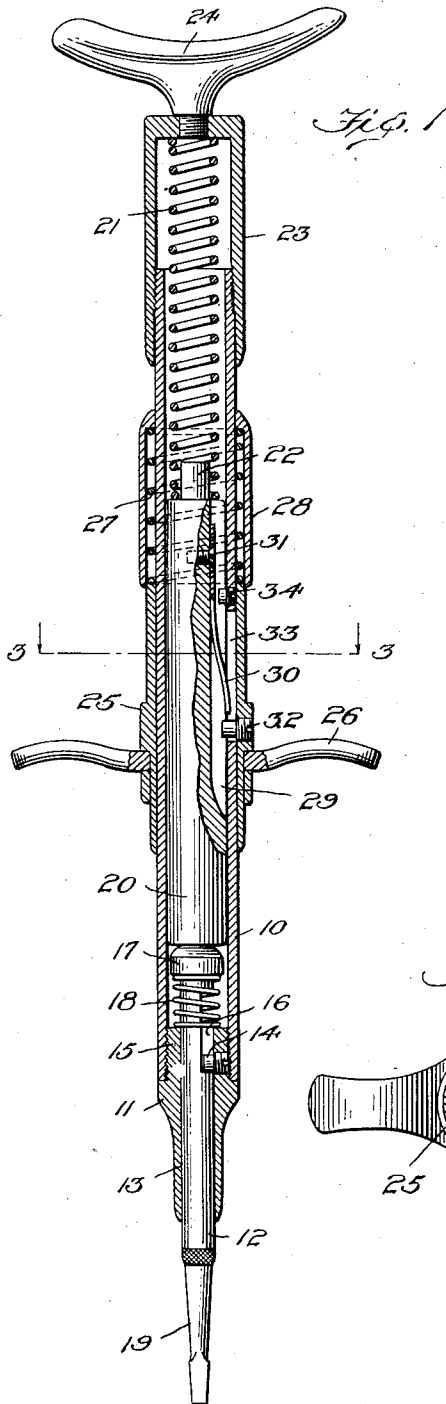
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AUTOMATIC SURGICAL MALLET

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AUTOMATIC SURGICAL MALLET

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The invention relates to surgical instruments and has for its general object the provision of a novel device for use by dentists, oral, throat and nose, and other surgeons for cutting bone in a simplified, convenient and less repulsive and nerve shocking manner than by ordinary methods.

An important object of the invention is the provision of an automatic mallet for this purpose provided interiorly with impact producing means which is readily operable and by means of which a blow of a predetermined force may be applied to the bone, the device being operable by one hand and making the services of an assistant unnecessary.

Another object of the invention is to provide an instrument of this character in which the force of the blow is obtained by spring pressure.

A further object is to provide a mallet having very simple means which may be readily adjusted for the purpose of varying the length of the stroke, and consequently the force, of the impact producing member so that different conditions may be met.

Still another object is to provide a device of this character in which all of the parts are readily separable in case of any necessity for making repairs or replacements.

An additional object is to provide a mallet which will be inexpensive to manufacture, easy to use and keep clean, positive in action, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the details of construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawings in which:

Figure 1 is a longitudinal section through the device,

Figure 2 is a side elevation thereof with a portion broken away and in section to illustrate the position of the parts when the impact producing member is released, and

Figure 3 is a cross section taken on the line 3—3 of Figure 1.

Referring more particularly to the draw-

ings I have shown the device as comprising an elongated preferably cylindrical barrel 10 to one end of which is secured, as by threading, a guide member 11 which carries the plunger 12, this plunger being slidable within the bore 13 and having its movement limited by a stop screw 14 of the grub type which extends through the reduced threaded portion 15 of the guide 11 and into a recess or cut away portion 16 in the plunger. This plunger is adapted to be reciprocated by impact and for this reason its inner end is shown as provided with a suitably attached impact receiving head 17 which also constitutes an abutment for one end of a coil spring 18 which has its other end abutting against the inner end of the guide 11, this spring acting normally to retract the plunger or to hold it at the inward limit of its movement. The exact tool 19 used is a matter to be determined by the requirements of the particular case and in actual practice it is probable that a plurality of bits, chisels, gouges, elevators, or other tools would be provided as part of the equipment so that any selected one may be connected with or mounted upon the plunger 12.

Slidably mounted within the intermediate portion of the barrel 10 is a hammer 20, likewise preferably of cylindrical form, urged toward the plunger 12 by a coil spring 21 abutting against one end of the hammer in encircling relation to a reduced extension 22 thereon and also abutting against the inner face of the end wall of a cap 23 screwed on to the barrel. Clearly, by adjusting the cap, by turning it in one direction or the other, the degree of pressure exerted by the spring 21 against the hammer may be varied, this being one means for regulating the force of the blow delivered by the hammer to the tool or bit. The closed end of the cap 23 carries a preferably curved saddle member 24 adapted to be engaged by the base of the operator's thumb during manipulation of the instrument.

The operating means is here disclosed as comprising a sleeve 25 of cylindrical form surrounding and slidable upon the barrel, this sleeve being equipped with a preferably

double ended finger piece or gripping member 26 held in place by any suitable means and adapted to be engaged by any desired two of the operator's fingers so that the sleeve 5 may be moved toward the saddle member 24. This sleeve is normally urged toward the bit end of the device by a coil spring 27 which surrounds the barrel and which is enclosed within a hood 28 suitably secured upon the 10 barrel, one end of this spring abutting against the inside of the hood and the other against the adjacent end of the sleeve 25 as clearly illustrated in Figure 1.

The hammer 20 is formed with a longitudinally extending groove 29 within which is located a longitudinally curved or bowed leaf spring 30 which is held in place by any suitable means such, for instance, as a screw 31 passing through 20 one end and threaded into the hammer. This spring 30 is adapted to cooperate with and be engaged by the inner end of a screw 32, likewise preferably of the grub type which screw is threaded through one side of the sleeve 25 and projects into and is movable along a slot 33 in one side of the barrel. This screw 32 is in obstructing relation to the end of the spring 30 so that when the 30 finger grips 26 are grasped and the sleeve 25 pulled toward the saddle member 24 the screw 32 will engage the spring 30 and move the hammer 20 longitudinally within the barrel 10 to effect compression of the spring 21, the stored-up energy of which is subsequently employed for forcing the hammer 20 into engagement with the head 17 for delivering the desired blow to the plunger 12 and consequently the bit 19. Threaded through one side of the barrel and normally covered by 40 the sleeve 25 is a screw 34, or other equivalent adjustable stop, located in the path of movement of the spring 30 and operating to force the spring 30 inwardly or toward the longitudinal axis of the barrel upon retraction of the hammer so that this leaf spring 30 will be forced out of engagement with the screw 32, thus permitting the spring 21 to force the hammer 20 in the opposite direction so that it will strike a sharp blow upon the 50 head 17 of the plunger. Clearly, the force will be transmitted through the plunger 12 to the bit 19. By adjusting the screw 34 so that it will project into the barrel to a greater or less extent, it is apparent that it is possible to vary or regulate the length of the retraction stroke of the hammer, it being clear that 55 when the screw 34 is caused to project farther into the barrel it will the sooner engage the spring 30 and force it out of engagement with the screw 32, thereby shortening the retraction stroke. It should also be understood that the same effect can be accomplished by adjusting the screw 32 to shorten the extent of its projection into the barrel. This latter 65 mentioned adjustment is probably the more

convenient to resort to as the screw 32 is always exposed whereas the screw 34 is intended to be normally covered by the sleeve 25. However, for the sake of clearness, both adjustments have been described.

Assuming that the cap 23 has been properly adjusted to give the desired pressure upon the hammer 20, and that adjustment of either or both of the screws 32 and 34 has been effected to give the hammer the desired and proper stroke, the device is used as follows: The instrument is taken in the hand with any two fingers engaging the grips 26 and with the base of the thumb engaging upon the saddle member 24. The operator then places the 80 chisel or other cutting tool against the bone to be cut and contracts his hand to slide the sleeve 25 toward the saddle member 24. The screw 32 will first engage against the end of the spring 30 and cause the hammer 20 to 85 move with the sleeve, the spring 21 being progressively compressed during the movement. As the spring 30 rides under or against the screw 34 it will be forced off from the screw 32, as clearly indicated in Figure 2, 90 thereby permitting the spring 21 to expand and force the hammer 20 sharply against the head 17 of the plunger, the plunger being then forced out against the resistance of the spring 18. This blow is of course transmitted through the bit against the bone in the intended manner. The outward movement of the bit may be described as relative for the reason that the bit is actually held against the bone, the result being that at the moment 100 of impact the entire instrument recoils. After each of such blows, the operator releases the contraction of the muscles in his hand and permits the spring 27 to move the sleeve 25, carrying the grips 26, toward the 105 bit end. The next stroke is accomplished by again contracting the hand and moving the sleeve as above described. As many strokes as necessary may be given and the operation of cutting the bone is accomplished step by 110 step as additional pieces of bone are cut.

From the foregoing description and a study of the drawings it will be apparent that I have thus provided a very simply constructed, inexpensive and easily operated and adjusted 115 device for the purpose specified which will efficiently perform all the functions for which it is intended. It is believed that the construction, operation and advantages will be readily apparent to one skilled in the art 120 without further explanation.

While I have shown and described the preferred embodiment of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as 125 the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the inven- 130

tion or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

5 1. In an automatic surgical mallet, a barrel, a spring retracted plunger slidable in one end thereof carrying a bit, a hammer slidable within the barrel formed in one side with a groove, a spring within the barrel engaging and compressible by said hammer upon movement of the latter away from the plunger, a leaf spring secured at one end within the groove in the hammer, a sleeve surrounding the barrel and slidable therealong and equipped with gripping means, a stop element carried by the sleeve and projecting into the slot and groove in obstructing relation to said leaf spring for locking the sleeve and the hammer together for movement away from said plunger, and means within the barrel and entering said groove and engageable by said leaf spring for moving the latter out of engagement with said stop element.

25 2. In an automatic surgical mallet, a barrel, a spring retracted plunger slidable in one end thereof carrying a bit, a hammer slidable within the barrel, a spring within the barrel engaging and compressible by said hammer upon movement of the latter away from the plunger, a leaf spring carried by the hammer, a sleeve surrounding the barrel and slidable therealong and equipped with gripping means, a stop element carried by the sleeve and projecting into the barrel in obstructing relation to said leaf spring for locking the sleeve and the hammer together for movement away from said plunger, and means within the barrel engageable by said leaf spring for holding the latter out of engagement with said stop element, said stop element being adjustable whereby its degree of projection into the barrel may be varied.

3. In an automatic surgical mallet, a barrel, a spring retracted plunger slidable in one end thereof carrying a bit, a hammer slidable within the barrel, a spring within the barrel engaging and compressible by said hammer upon movement of the latter away from the plunger, a leaf spring carried by the hammer, a sleeve surrounding the barrel and slidable therealong and equipped with gripping means, a stop element carried by the sleeve and projecting into the barrel in obstructing relation to said leaf spring for locking the sleeve and the hammer together for movement away from said plunger, and means within the barrel engageable by said leaf spring for holding the latter out of engagement with said stop element, said means being adjustable whereby its degree of projection toward said leaf spring may be varied.

4. In an automatic surgical mallet, a barrel, a spring retracted plunger slidable in one end thereof carrying a bit, a hammer slidable within the barrel, a spring within the barrel engaging and compressible by said hammer upon movement of the latter away from the plunger, a leaf spring carried by the hammer, a sleeve surrounding the barrel and slidable therealong and equipped with gripping means, a stop element carried by the sleeve and projecting into the barrel in obstructing relation to said leaf spring for locking the sleeve and the hammer together for movement away from said plunger, means within the barrel engageable by said leaf spring for holding the latter out of engagement with said stop element, and means for adjusting the initial compression of said hammer engaging spring.

In testimony whereof I affix my signature.
DAVID REITER.